

Zach Houghtaling - Cincinnati Reds Assessment

Part C

For this part, I conducted some statistical tests to evaluate which of Pitcher A or B had the higher fastball release velocity, higher curveball spin rate, and if there was a difference in the proportions of each of the pitch outcome occurrences. I also calculated the IP, FIP, WHIP, SB%, and evaluated the K/BB ratio to aid in my determination that *Pitcher A is the player I would like to build my rotation around.*

I found that there's an overwhelming amount of statistical evidence that the fastball release velocities are somewhere between 4.26 to 4.47 mph higher for player A (Appendix A) and the curveball spin rate is between 961.46 to 1090.32 RPM higher for player A compared to player B (Appendix B). These statistical arguments support my claims as to player A having a strong advantage in the raw "stuff" factor considerations.

There was a lower percentage of pitches put in play off player A (A: 12.19% | B: 14.07%) while the swing and miss rate was a bit higher for player A which is what we would prefer (A: 14.46% | B: 14.23%). Player A also threw a higher proportion of called strikes (A: 17.32% | B: 15.07%). Their respective overall strike percentages were almost identical at 63.537% for Player A and 62.538% for player B. None of these differences were found to be statistically significantly different for Player A compared to Player B via Two-Proportion Z-Tests.

The last tests I conducted to compare the two pitchers was the comparison of different well-known metrics I engineered into the data.

	strikeout	walk	IP	WHIP	FIP
playerA_Freq	148	66	223.6667	1.162444	3.238186
playerB_Freq	152	48	223.6667	1.073025	2.925221

Player B performed better in this minor league season than Player A putting up a lower FIP value of 2.93 and a WHIP of 1.07 compared to Player A's FIP of 3.24 and WHIP of 1.07. Player B also had a better K/BB ratio at 152/48 versus Player A's 148/66. These statistics show Player B had the advantage in performance for this season evaluated.

Despite Player B's FIP and K/BB being better, with the similarity of the other stats such as an identical innings pitched value and stolen base success rate against percentage, I would like to see Player A as a player to build our rotation around. Player B had more success in this minor league season but I prefer the higher ceiling of Player A based on his elite fastball velocity and curveball spin rate that were both statistically better than Player B. Their statistically indifferent proportion of strikes also show Player A has the potential to decrease his walks in upcoming seasons which would make him the better pitcher based on his raw ability considerations.

Appendix A - Release Speed Two-Sample T-Test (Unequal Variances)

Welch Two Sample t-test

data: RELEASE_SPEED by PITCHER_KEY

t = 82.06, df = 1979.7, p-value < 2.2e-16

alternative hypothesis: true difference in means between group A and group B is not equal to 0

95 percent confidence interval:

4.258471 4.467002

sample estimates:

mean in group A mean in group B

96.17280 91.81006

Appendix B - Curveball Spin Rate Two-Sample T-Test (Equal Variances)

Two Sample t-test

data: SPIN_RATE by PITCHER_KEY

t = 31.259, df = 733, p-value < 2.2e-16

alternative hypothesis: true difference in means between group A and group B is not equal to 0

95 percent confidence interval:

961.4598 1090.3191

sample estimates:

mean in group A mean in group B

1820.843 794.954